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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,768	05/07/2007	Robert D'Alessandro	290162US0PCT	8287
22850	7590	05/18/2009	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			NGUYEN, HUY TRAM	
			ART UNIT	PAPER NUMBER
			1797	
			NOTIFICATION DATE	DELIVERY MODE
			05/18/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/576,768	Applicant(s) D'ALESSANDRO ET AL.	
	Examiner HUY-TRAM NGUYEN	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 16-21, 25, 37 and 38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 9, 10, 16-21, 25, 37 and 38 is/are rejected.
- 7) ☒ Claim(s) 3, 5-8 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 April 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/21/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “122” has been used to designate “Destruct Reactor”, “Stirred Tank” and “Raffinate Wash Column”. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 9 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by **Park et al. (US Patent No. 5,004,830)**.

Regarding Claim 1, Park et al. reference discloses a process, which comprises:

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contacting a first liquid comprising at least one hydrocarbon compound with a first oxidant in a first reactor (**Figure, numerals 100, 107, 105, and 103 and Column 9, Lines, 33-48**); and

contacting a second liquid comprising at least one hydrocarbon obtained from the first reactor with a second oxidant in a second reactor (**Figure, numerals 132, 154, 203, 206 and 200 and Column 9, Lines 54-66**).

Regarding Claim 9, Park et al. reference discloses the process as claimed in claim 1, which further comprises:

contacting a third liquid obtained from the second reactor with a third oxidant in a third reactor (**Figure, numerals 252, 254, 303, 306 and 300 and Column 9, Lines 11-21**).

Regarding Claim 19, Park et al. reference discloses the process as claimed in claim 1, wherein the concentration of the first oxidant fed to the first reactor is less than or equal to the concentration of the second oxidant fed to the second reactor (**Column 9, Lines 40-42 and 60-62**).

4. Claims 37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Gore et al. (**US 2002/0035306 A1**).

Regarding Claim 37, Gore et al. reference discloses a multi-stage system, comprising:

- (a) an oxidation stage (**Figure 1, numeral 2**);
- (b) an extraction stage (**Figure 1, numeral 3**);
- (c) a raffinate washing stage (**Figure 1, numeral 4**);

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- (d) a raffinate polishing stage (**Figure 1, numeral 5**);
- (e) a solvent recovery stage (**Figure 1, numerals 6 and 7**);
- (f) a solvent purification stage (**Figure 1, numeral 8**); and
- (g) a hydrocarbon recovery stage (**Page 3, Paragraph [0033] – flash distillation or solid adsorber bed**).

Regarding Claim 38, Gore et al. reference discloses a process for reducing the concentration of organosulfur compounds in a liquid, which comprises:

- treating at least one liquid comprising hydrocarbons with at least one of stage (a)
- (g) as claimed in claim 37 to obtain a product gas oil (**Abstract**).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1, 2, 4, 9-21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Gore et al. (US Patent No. 6,596,914 B2) in view of Park et al. (US Patent No. 5,004,830)**.

Regarding Claim 1, Gore et al. reference discloses a process, which comprises: contacting a first liquid comprising at least one hydrocarbon compound with a first oxidant in a first reactor (**Figure 2, numerals 20 and C and Column 8, Line 64-Column 9, Line 14**).

Also, Gore et al. reference discloses that the oxidation can be a packed or agitated column, one or more tanks in series, or a similar device that provides adequate phase mixing, minimum back-mixing, and the required residence time to reach the desired conversions (**Column 9, Lines 15-25**). However, Gore et al. reference does not disclose the process step of the second reactor of contacting a second liquid comprising at least one hydrocarbon obtained from the first reactor with a second oxidant in a second reactor.

Park et al. reference discloses an oxidation process being conducted in at least two oxidation reactions (**Abstract, Figure, numerals 100 and 200 and Column 9, Lines, 33-66**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to operate the process of Gore et al. with the oxidation steps as taught by Park et al., since Park et al. states at Abstract that such a modification would improve selectivity, product yield and product quality.

Regarding Claim 2, Gore et al. and Park et al. references disclose the process as claimed in claim 1, wherein the second liquid is selected from the group consisting of a first effluent, a first light phase, and mixtures thereof; wherein the first effluent is obtained from the first reactor (**Park et al. – Figure, numerals 132 and 154 – first effluent**);

Regarding Claim 4, Gore et al. and Park et al. references disclose the process as claimed in claim 1, further comprising:

contacting a liquid and an aqueous solution in a raffinate wash column to obtain an aqueous extract and a washed raffinate (**Gore et al. - Figure 2, numeral 27 – sulfone extractor and Column 9, Lines 50-56**);

wherein the liquid comprises at least one of a second effluent obtained from the second reactor, a second light phase obtained from a second vessel, a first raffinate obtained from an extraction column (**Figure 2, numerals 25 – peroxide eliminator and Column 9, Lines 50-56**), or mixtures thereof;

recovering a polar solvent from a crude polar solvent to obtain a recovered liquid (**Figure 1, numerals 8, B, E, and D – solvent purification**);

wherein the crude polar solvent comprises at least one of a first extract obtained from an extraction column (**Column 11, Lines 3-11**), a second heavy phase obtained from a second vessel, a first heavy phase obtained from a first vessel, or mixtures thereof.

Regarding Claim 9, Gore et al. and Park et al. references discloses the process as claimed in claim 1, which further comprises:

contacting a third liquid obtained from the second reactor with a third oxidant in a third reactor (**Park et al. - Figure, numerals 252, 254, 303, 306 and 300 and Column 9, Lines 11-21**).

Regarding Claim 10, Gore et al. and Park et al. reference disclose the process as claimed in claim 9, wherein the third liquid is selected from the group consisting of a second effluent, a second light phase, and mixtures thereof; wherein the second effluent is obtained from the second reactor (**Park et al. – Figure, numerals 200, 300, 232 and 254**).

Regarding Claim 16, Gore et al. and Park et al. references disclose the process as claimed in claim 1, wherein the first liquid comprises a middle distillate comprising hydrocarbons (**Gore et al. – Column 8, Lines 17-34**). Even though Gore et al. reference does not disclose the hydrocarbons having boiling points that range from 65°C to 385°C, it would have been obvious to one having ordinary skill in the art at the time the invention was made to operate the process of Gore et al. in view of Park et al. with the claimed middle distillate, since Gore et al. states at **Column 8, Lines 17-34** that the process is applicable also for other fuels for removing sulfur aromatic compounds.

Regarding Claim 17, Gore et al. and Park et al. references disclose the process as claimed in claim 1, wherein the first liquid comprises crude gas oil obtained by a hydrodesulfurizing process (**Gore et al. - Column 5, Lines 14-17**).

Regarding Claim 18, Gore et al. and Park et al. references disclose the process as claimed in claim 1 except for the step of hydrodesulfurizing a product gas oil obtained by said process. It would have been obvious to one having ordinary skill in the art at the time the invention was made to operate the process of Gore et al. and Park et al. with additional step of hydrodesulfurization since it was known in the art to hydrodesulfurize to remove sulfur impurity components from a feed stream.

Regarding Claim 19, Gore et al. and Park et al. references disclose the process as claimed in claim 1, wherein the concentration of the first oxidant fed to the first reactor is less than or equal to the concentration of the second oxidant fed to the second reactor (**Park et al. – Column 9, Lines 40-42 and 60-62**).

Regarding Claim 20, Gore et al. and Park et al. references disclose the process as claimed in claim 1, wherein the first liquid comprises unoxidized organosulfur compounds and the concentration of the unoxidized organosulfur compounds in the first liquid is greater than the concentration of the unoxidized organosulfur compounds in the second liquid (**inherency – the unoxidized organosulfur compounds being oxidized and converted into corresponding mono and di-oxide in the each oxidation step; thus the concentration of the unoxidized organosulfur compounds would be greater in the first liquid than the second liquid**).

Regarding Claim 21, Gore et al. and Park et al. references disclose the process as claimed in claim 1, wherein the first liquid comprises at least one unoxidized compound and the concentration of the at least one unoxidized compound in a first effluent obtained from the first reactor is greater than the concentration of the at least one unoxidized compound in a second effluent obtained from the second reactor; and wherein the unoxidized compound is at least one unoxidized compound selected from the group consisting of an unoxidized organosulfur compound and an unoxidized organo- nitrogen compound **(inherency -the unoxidized organosulfur or organo-nitrogen compounds being oxidized and converted into corresponding mono and di-oxide in the each oxidation step; thus the concentration of the unoxidized organosulfur or organo-nitrogen compounds would be greater in the first effluent than the second effluent).**

Regarding Claim 25, Gore et al. and Park et al. references disclose the process as claimed in claim 1, further comprising: obtaining a product gas oil having a sulfur content less than 500 ppmw **(Gore et al. – Column 10, Lines 29-36).**

Allowable Subject Matter

9. Claims 3, 5-8 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. The following is a statement of reasons for the indication of allowable subject matter:

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Regarding Claims 3, 5, 6, 7 and 8, Gore et al. and Park et al. references disclose the process as claimed in claim 1 except for step of distilling hydrocarbons by heating the recovered liquid at a pressure less than about 1 bar absolute because the recovered liquid of Gore et al. process does not contain hydrocarbons when being introduced to the solvent purification column (solvent B, water E and recycled catalyst D). The hydrocarbons containing in the bottoms fraction which is recycled to the oxidation process step with solvent (**Gore et al. – Column 11, 23-35**).

Regarding Claim 11, Gore et al. and Park et al. references disclose the process as claimed in claim 1 except for the first oxidant is selected from the group consisting of a second heavy phase, a third heavy phase, and mixtures thereof; wherein the second heavy phase is obtained from a second vessel and the third heavy phase is obtained from a third vessel since the oxidant is recovered and recycled back to the oxidation process step from the solvent purification column (**Gore et al. - Figures 1 & 2**).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUY-TRAM NGUYEN whose telephone number is (571)270-3167. The examiner can normally be reached on MON- THURS: 6:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HTN
5/12/09

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797